

# Programmable Melody Generator

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## Abstract

A digital system and method of operation is provided in which musical notes and melodies are synthesized. The operation done for music synthesis is based on time domain processing of prerecorded waveforms, referred to as analysis waveforms. The computations are done using time-marks, which is a set of digital sample positions of the analysis waveform indicating the starting position of each period of the fundamental frequency or an arbitrary position for non-periodic analysis waveforms. The algorithm defines on a time scale the time-marks of the synthesis waveform. The synthesis is based on making a relation between the analysis time-marks and the synthesis time-marks. The synthesis waveforms are built with the extraction of small portions of signal located at corresponding time-mark positions of the analysis waveform and adding them to the corresponding synthesis time-marks on the synthesis time-scale. This extraction is done with the multiplication of a windowing pattern, such as a cosinus Hanning window, to the analysis samples.